

**Amendments to the Claims:**

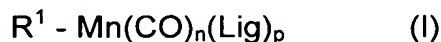
The following claims will replace all prior versions of the claims in this application (in the unlikely event that no claims follow herein, the previously pending claims will remain):

1-32. (Cancelled).

33. (Previously Presented) A method of polymerising ethylenically unsaturated monomers in which at least one ethylenically unsaturated monomer is polymerised using a catalyst system, comprising:

- i) a manganese carbonyl radical initiator;
- ii) a halogen containing reactive substrate; and
- iii) an allylic halogen substituted chain termination agent.

34. (Previously Presented) The method of claim 33, wherein the initiator is or comprises a compound represented by formula (I):



where

- $R^1$  independently represents a  $C_1$  to  $C_{30}$  hydrocarbyl; or a  $C_1$  to  $C_{30}$  hydrocarbyl substituted with halogen, alkyl, alkoxy, acyl; or
- $R^1$  independently represents a group of the formula:  $-Mn(CO)_n(Lig)_p$ ;
- Lig independently represents a ligand species;
- n independently represents an integer from 1 to 5; and
- p independently represents an integer from 0 to 4;

wherein  $(n + p) = 5$ .

35. (Previously Presented) The method of claim 34, wherein the initiator is or comprises a compound represented by formula (Ia):



where

- Lig independently represents a ligand species;
- n independently represents an integer from 1 to 5;
- p independently represents an integer from 0 to 4; and

wherein  $(n + p) = 5$ .

36. (Previously Presented) The method of claim 35, wherein the initiator is dimanganese decacarbonyl.

37. (Currently Amended) The method of claim 33, wherein the ~~an~~-allylic halogen substituted chain termination agent is a compound represented by formula (II):



where

Hal independently represents halogen; and  
R<sup>3</sup> and R<sup>4</sup> each independently represents a hydrogen atom, or a group:  
(Link)<sub>n</sub>-R<sup>5</sup>;

where:

n independently represents an integer 0 or 1;  
Link independently represents a linking group; and  
R<sup>5</sup> independently represents halogen; glycidyl; an ethylenic double bond; carbonyl; carboxyl; cyano; hydroxyl; amino or quaternary amino or ammonium; a phosphorus containing species; a sulphur containing species; a hydrogen bond donor or acceptor; an aromatic ring; a heterocyclic ring; or a saccharide residue.

38. (Previously Presented) The method of claim 37, wherein Hal independently represents a chlorine atom or bromine atom.

39. (Previously Presented) The method of claim 33, wherein the reactive substrate is also a chain terminating agent.

40. (Previously Presented) The method of claim 33, wherein the reactive substrate is or comprises a halogen substituted alkane; an alcohol or carboxylic acid ester; an aromatic substituted alkyl halide; a ring substituted benzyl halide; or a sulphonyl halide.

41. (Previously Presented) The method of claim 40, wherein the reactive substrate has multiple halogen substitution.

42. (Previously Presented) The method of claim 40, wherein the reactive substrate is or comprises carbon tetrachloride; carbon tetrabromide; chlorotribromomethane; trichloromethane; tribromomethane; dichloromethane; dibromomethane; 1,1-dichloroethane; 1,1-dibromoethane; 1,1,1-trichloroethane; 1,1,1-tribromoethane; 2,2-dichloroethanol; 2,2-dibromoethanol; 2,2,2-trichloroethanol; 2,2,2-tribromoethanol; trichloroacetic acid; C<sub>1</sub> to C<sub>6</sub> alkyl esters of trichloroacetic acid; C<sub>2</sub> to C<sub>6</sub> alkyl 2-bromo-2-methyl propionates; benzyl halides; 2-halo-2-phenylethanes; 4-alkyl benzyl halides; 4-fluorobenzyl bromide; 4-chlorobenzyl bromide; 4-fluorobenzyl chloride; 4-chlorobenzyl chloride; 1,2-di(bromomethyl)benzene; benzene sulphonyl chloride; and toluene sulphonyl chloride.

43. (Previously Presented) The method of claim 33, wherein the monomer is or comprises one or more of an acrylic monomer; a vinyl acetate; a vinyl halide; a styrene; a  $\alpha$ -methyl styrene; a vinyl toluene; a vinyl caprolactone; a vinyl caprolactam; or a *N*-vinyl pyrrolidone.

44. (Previously Presented) The method of claim 43, wherein the monomer comprises at least 40 mole% of acrylic monomer or monomers.

45. (Currently Amended) The method of claim 43, wherein the acrylic monomer is or comprises monomer represented by formula (IV):



where

- R<sup>10</sup> independently represents methyl or a hydrogen atom;
- R<sup>11</sup> independently represents methyl or a hydrogen atom;
- R<sup>12</sup> independently represents methyl or a hydrogen atom; and
- R<sup>13</sup> independently represents -OR<sup>14</sup> or -NR<sup>15</sup>R<sup>16</sup>;

wherein:

- i) at least one of R<sup>11</sup> and R<sup>12</sup> represents a hydrogen atom;
- ii) R<sup>14</sup>, R<sup>15</sup>, and R<sup>16</sup> independently represent a hydrogen atom; a hydrocarbyl group; or a polyalkyleneoxy chain.

46. (Currently Amended) The method of claim 45, wherein the monomer is or comprises one or more of the following: ~~a~~an acrylate ester; a methacrylate ester; ~~an~~ acrylic acid; ~~a~~-methacrylic acid; an acrylic amide; a methacrylic amide; or a sulphonated acrylic monomer.

47. (Previously Presented) The method of claim 33, wherein the reaction conditions comprise heating the reaction mixture containing the manganese carbonyl radical initiator to initiate thermolysis of the initiator.

48. (Previously Presented) The method of claim 47, wherein the reaction is carried out at a temperature of from 50 to 150°C.

49. (Previously Presented) The method of claim 48, wherein the reaction is carried out at a temperature of from 50 to 100°C.

50. (Previously Presented) The method of claim 33, wherein the reaction conditions comprise exposing the reaction mixture containing the manganese carbonyl radical initiator to actinic radiation to initiate photolysis of the initiator.

51. (Previously Presented) The method of claim 50, wherein the actinic radiation is visible or ultraviolet light.

52. (Previously Presented) The method of claim 50, wherein the reaction is carried out at a temperature of from -50 to 100°C.

53. (Previously Presented) The method of claim 33, wherein the reaction mixture further comprises a Lewis acid.

54. (Currently Amended) The method of claim 53, wherein the Lewis acid comprises a metal containing Lewis acid, ~~comprising a magnesium salt, a zinc salt, a lanthanum salt, or a ytterbium salt.~~

55. (Currently Amended) The method of claim 66-54, wherein the metal containing Lewis acid comprises a magnesium halide, a zinc halide, a lanthanum salt, or a ytterbium halide.

56. (Currently Amended) A method of polymerising ethylenically unsaturated monomers in which at least one ethylenically unsaturated monomer is polymerised using a catalyst system, comprising:

- i) a manganese carbonyl radical initiator;
- ii) a halogen containing reactive substrate; and
- iii) an allylic halogen substituted chain termination agent;

wherein the polymerization reaction mixture further comprises a metal containing Lewis acid, comprising magnesium bromide; magnesium chloride; zinc bromide; zinc chloride; zinc trifluoromethanesulfonate; lanthanum acetate; lanthanum acetate heptahydrate; ~~heptahydrate,~~ ytterbium chloride; or ytterbium triflate.

57. (Previously Presented) A catalyst system for polymerising ethylenically unsaturated monomers, comprising:

- i) a manganese carbonyl radical initiator;
- ii) a halogen containing reactive substrate; and
- iii) an allylic halogen substituted chain termination agent.

58. (Previously Presented) The catalyst system of claim 57, wherein the initiator is or comprises the compound represented by formula (I).

59. (Previously Presented) The catalyst system of claim 57, wherein the chain terminating agent is or comprises the compound represented by formula (II).

60. (Previously Presented) The catalyst system of claim 57, wherein the reactive substrate is also a chain terminating agent.

61. (Previously Presented) The catalyst system of claim 57, further comprising a Lewis acid.

62. (Currently Amended) The catalyst system of claim 61, wherein the Lewis acid comprises a metal containing Lewis acid, ~~comprising a magnesium salt, a zinc salt, a lanthanum salt, or a ytterbium salt.~~

63. (Currently Amended) The catalyst system of claim 69-62, wherein the metal containing Lewis acid comprises a magnesium halide; a zinc halide; a lanthanum salt, or a ytterbium halide.

64. (Currently Amended) A catalyst system for polymerising ethylenically unsaturated monomers, comprising:

- i) a manganese carbonyl radical initiator;
- ii) a halogen containing reactive substrate;
- iii) an allylic halogen substituted chain termination agent; and
- iv) a metal containing Lewis acid, comprising magnesium bromide; magnesium chloride; zinc bromide; zinc chloride; zinc trifluoromethanesulfonate; lanthanum acetate; lanthanum acetate heptahydrate; ~~heptahydrate~~, ytterbium chloride; or ytterbium triflate.

65. (Cancelled).

66. (New) The method of claim 54, wherein the metal containing Lewis acid, comprises a magnesium salt; a zinc salt; a lanthanum salt; or a ytterbium salt.

67. (New) The method of claim 66, wherein the metal containing Lewis acid, comprises magnesium bromide; magnesium chloride; zinc bromide; zinc chloride; zinc trifluoromethanesulfonate; lanthanum acetate; lanthanum acetate heptahydrate; ytterbium chloride; or ytterbium triflate.

68. (New) The method of claim 67, wherein the metal containing Lewis acid, comprises lanthanum acetate heptahydrate.

69. (New) The catalyst system of claim 62, wherein the metal containing Lewis acid, comprises a magnesium salt; a zinc salt; a lanthanum salt; or a ytterbium salt.

70. (New) The catalyst system of claim 69, wherein the metal containing Lewis acid, comprises magnesium bromide; magnesium chloride; zinc bromide; zinc chloride; zinc trifluoromethanesulfonate; lanthanum acetate; lanthanum acetate heptahydrate; ytterbium chloride; or ytterbium triflate.

71. (New) The catalyst system of claim 70, wherein the metal containing Lewis acid, comprises lanthanum acetate heptahydrate.